

Section C

Transportation Energy Intensity and Fuel Efficiency

Table 4-20 Energy Intensity of Passenger Modes (Btu per passenger-mile)

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Air^R											
Certificated air carrier											
Domestic operations	8,633	10,118	10,185	7,746	5,727	5,047	4,932	4,382	4,183	4,146	4,123
International operations	9,199	10,292	10,986	8,465	8,866	5,103	4,546	4,173	4,108	4,168	4,278
Highway^b											
Passenger car	4,495	4,455	4,841	4,743	4,348	4,267	3,812	3,721	3,702	3,657	3,672
Other 2-axle 4-tire vehicle	N	N	6,810	6,571	5,709	4,971	4,451	^R 4,539	^R 4,560	^R 4,563	4,591
Motorcycle	^a	^a	2,500	2,354	2,125	1,896	1,990	^R 2,227	^R 2,250	^R 2,295	2,330
Transit motor bus	N	N	N	N	2,742	^R3,396	^R3,723	^R4,155	^R4,196	^R4,228	^P3,729
Amtrak	N	N	N	2,383	^R2,164	^R2,094	^R2,064	1,838	^R2,148	2,200	2,138

^a Included in passenger car.

^b For 1995 and subsequent years, highway passenger-miles were taken directly from Highway Statistics rather than derived from vehicle-miles and average occupancy, as is the case for 1960-1994.

NOTES: To calculate total Btu, multiply fuel consumed (see tables 4-22, 4-23, 4-24, 4-25) by 135,000 Btu/gallon for air carrier, 125,000 Btu/gallon for passenger car, other 2-axle 4-tire vehicle, and motorcycle, and 138,700 Btu/gallon for transit motor bus and Amtrak.

SOURCES:

Air:

Certificated air carriers:

Passenger-miles: 1960-99: Air Transport Association, Internet site <http://www.air-transport.org/public/industry>, as of July 5, 2000.

Fuel consumed: 1960-99: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site <http://www.bts.gov/oai/fuel/fuel-yearly.html>, as of July 5, 2000.

Highway:

Passenger car: 1960-94: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-98: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Other 2-axle 4-tire vehicle: 1970-94: Ibid., *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-98: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Motorcycle: 1970-85: Ibid., *Highway Statistics Summary to 1985*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1990-98: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Transit motor bus:

1980-98: American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: March 2000), tables 30, 42; and 65.

Amtrak:

1975-98: Amtrak, State and Local Affairs Department, personal communications.

KEY: Btu = British thermal unit; N = data do not exist; P = preliminary; R = revised

Table 4-21 Energy Intensity of Certificated Air Carriers, All Services^a

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999
Aircraft-miles (millions)												
Domestic operations	858	1,134	2,068	1,948	2,523	3,046	3,963	4,629	4,811	4,911	5,031	5,176
International operations	182	284	475	377	401	415	760	998	1,043	1,114	1,191	1,197
Available seat-miles (millions)^R												
Domestic operations	52,220	94,787	213,160	241,282	346,028	445,826	563,065	603,917	626,389	640,319	649,442	686,940
International operations	13,347	29,533	51,960	61,724	86,507	101,963	170,310	203,160	208,682	216,913	224,728	230,909
Passenger-miles (millions)^R												
Domestic operations	30,557	51,887	104,147	131,728	200,289	270,584	340,231	394,708	425,596	442,640	455,799	479,689
International operations	8,306	16,789	27,563	31,082	54,363	65,819	117,695	145,948	153,067	160,779	163,656	171,908
Fuel consumed (million gallons)												
Domestic operations	1,954	3,889	7,857	7,558	9,096	^R 10,115	^R 12,429	12,812	^R 13,187	13,660	13,877	14,402
International operations	566	1,280	2,243	1,949	1,938	^R 2,488	^R 3,963	^R 4,511	^R 4,658	4,964	5,186	5,250
Seats per aircraft^R												
Domestic operations	60.9	83.6	103.1	123.9	137.1	146.4	142.1	130.5	130.2	131.1	129.1	132.7
International operations	73.3	104.0	109.4	163.7	215.7	245.7	224.1	203.6	200.1	194.7	188.7	192.9
Seat-miles per gallon^R												
Domestic operations	27	24	27	32	38	44	45	47	48	47	47	48
International operations	24	23	23	32	45	41	43	45	45	44	43	44
Energy intensity (Btu/passenger-mile)^{b, R}												
Domestic operations	8,633	10,118	10,185	7,746	6,131	5,047	4,932	4,382	4,183	4,146	4,123	4,053
International operations	9,199	10,292	10,986	8,465	4,813	5,103	4,546	4,173	4,108	4,168	4,278	4,123
Load factor (%)												
Domestic operations	^R 58.5	^R 54.7	^R 48.9	^R 54.6	^R 58.0	^R 60.7	^R 60.4	^R 65.4	^R 67.9	69.1	70.2	69.8
International operations	^R 62.2	^R 56.8	^R 53.0	^R 54.4	^R 62.8	^R 64.6	^R 69.1	^R 71.8	^R 73.3	74.1	^R 72.8	74.4

KEY: Btu = British thermal unit; R = revised

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Table 4-21
Cont'd

Energy Intensity of Certificated Air Carriers, All Services^a

^a U.S. owned carriers only. Operation of foreign-owned carriers in or out of the United States not included.

^b Calculation based on unrounded figures not shown here.

NOTES: Aircraft-miles includes all four air-carrier groups (majors, nationals, large regionals, and medium regionals), scheduled and charter, passenger, and all-cargo. Fuel consumed includes majors, nationals, and large regionals, scheduled and charter, passenger, and all-cargo. Passenger-miles includes all four air-carrier groups, scheduled and charter, passenger service only. International operations include operations outside the United States, including those between the United States and foreign countries and the United States and its territories or possessions. Domestic and international load factor values for 1999 are derived by calculation. Heat equivalent factor used for Btu conversion is 135,000 Btu/gallon.

SOURCES:

Aircraft-miles, available seat-miles, passenger-miles, and load factor: 1960-80: Air Transport Association, Internet site <http://www.air-transport.org/public/industry>, as of July 5, 2000.

1985-98: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, *Air Carrier Traffic Statistics* (Washington DC: Annual December issues).

Fuel consumed: 1960-99: U.S. Department of Transportation, Bureau of Transportation Statistics, Office of Airline Information, Internet site <http://www.bts.gov/oai/fuel/fuelyearly.html>, as of July 5, 2000.

Seats per aircraft, seat-miles per gallon, and energy intensiveness: Derived by calculation.

Table 4-22 Energy Intensity of Passenger Cars, Other 2-Axle 4-Tire Vehicles, and Motorcycles

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Vehicle-miles (millions)											
Passenger car	587,000	723,000	917,000	1,034,000	1,112,000	1,247,000	1,408,000	1,438,000	1,470,000	^R 1,503,000	1,546,000
Other 2-axle 4-tire vehicle	N	N	123,000	201,000	291,000	391,000	575,000	790,000	817,000	^R 851,000	866,000
Motorcycle	^b	^b	3,000	5,600	10,200	9,100	9,600	9,800	9,900	10,100	10,300
Passenger-miles (millions)^a											
Passenger car	1,145,000	1,395,000	1,751,000	1,954,000	2,012,000	2,094,000	2,282,000	^R 2,287,000	2,337,000	^R 2,389,000	2,458,000
Other 2-axle 4-tire vehicle	N	N	226,000	363,000	521,000	688,000	1,000,000	^R 1,256,000	^R 1,298,000	^R 1,353,000	1,377,000
Motorcycle	^b	^b	3,000	6,000	12,000	12,000	12,000	^R 11,000	^R 11,000	^R 11,000	11,000
Fuel consumed (million gallons)											
Passenger car	41,171	49,723	67,819	74,140	69,982	71,518	69,568	68,072	69,221	^R 69,892	72,209
Other 2-axle 4-tire vehicle	N	N	12,313	19,081	23,796	27,363	35,611	45,605	47,354	^R 49,388	50,579
Motorcycle	^b	^b	60	113	204	182	191	196	198	202	205
Energy intensity (BTU/passenger-mile)											
Passenger car	4,495	4,455	4,841	4,743	4,348	4,269	3,811	3,721	3,702	3,657	3,672
Other 2-axle 4-tire vehicle	N	N	6,810	6,571	5,709	4,971	4,451	4,539	4,560	4,563	4,591
Motorcycle	^a	^a	2,500	2,354	2,125	1,896	1,990	2,227	2,250	2,295	2,330

^a Passenger-miles are derived by multiplying vehicle-miles by an average occupancy rate for that vehicle type based on data provided by the Federal Highway Administration, Nationwide Personal Transportation Survey, 1977, 1983, 1995. Average vehicle occupancy rates are as follows: passenger car (1960-97): 1.95, 1.93, 1.91, 1.89, 1.81, 1.68, 1.62, 1.62, 1.61, 1.61, 1.60, 1.59, 1.59, 1.59; other 2-axle 4-tire vehicle (1960-97): 1.87, 1.85, 1.83, 1.81, 1.79, 1.76, 1.74, 1.72, 1.70, 1.68, 1.66, 1.64, 1.64, 1.64; motorcycle (1960-97): 1.1, 1.1, 1.1, 1.1, 1.2, 1.3, 1.3, 1.27, 1.25, 1.23, 1.21, 1.18, 1.18.

^b Included in passenger car.

NOTES: In 1995, the U.S. Department of Transportation, Federal Highway Administration revised its vehicle type categories for 1993 and later data. These new categories include passenger car, other 2-axle 4-tire vehicle, single-unit 2-axle 6-tire or more truck, and combination truck. Other 2-axle 4-tire vehicle includes vans, pickup trucks, and sport utility vehicles. In previous years, some minivans and sport utility vehicles were included in the passenger car category. Single-unit 2-axle 6-tire or more trucks are on a single frame with at least 2 axles and 6 tires. Pre-1993 data have been reassigned to the closest available category.

The heat equivalent factor used for Btu conversion is 125,000 Btus/gallon.

SOURCES:

Vehicle-miles:

Passenger car: 1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-98: Ibid.,

Highway Statistics (Washington, DC: Annual issues), table VM-1.

Other 2-axle 4-tire vehicle: 1960-90: Ibid., *Highway Statistics, Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-98: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Motorcycle: 1970-85: Ibid., *Highway Statistics, Summary to 1985* (Washington, DC: 1986), table VM-201A. For 1970-90, the unrevised motorcycle vehicle-miles are subtracted from the combined passenger car and motorcycle vehicle-miles from VM-201A.

1990-98 Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

Passenger-miles: Passenger-miles multiplied by vehicle occupancy rates.

Fuel consumed: 1960-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A. For 1970-90, the unrevised motorcycle fuel consumed is subtracted from the combined passenger car and motorcycle fuel consumed from VM-201A.

1995-98: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

KEY: Btu = British thermal unit; N = data do not exist; R = revised

Table 4-23 Average Fuel Efficiency of U.S. Passenger Cars and Light Trucks

	1980	1985	1990	1995	1996	1997	1998	1999
Average U.S. passenger car fuel efficiency (mpg) (calendar year)								
Passenger car	15.9	17.4	20.2	21.1	21.2	21.5	^R 21.6	21.4
Other 2-axle 4-tire vehicle	12.2	14.3	16.1	17.3	17.2	17.2	^R 17.2	17.1
New vehicle fuel efficiency (mpg)^a (model year)								
Light-duty vehicle (passenger cars plus light trucks)								
Domestic	21.4	24.0	23.9	23.8	24.1	^R 23.3	^R 23.3	23.7
Imported	28.6	30.3	28.5	27.9	27.7	27.5	27.6	26.9
Passenger car								
Domestic	22.6	26.3	26.9	27.7	28.3	^R 27.8	^R 28.1	28.2
Imported	29.6	31.5	29.9	30.3	29.7	^R 30.1	^R 30.0	28.4
Light truck (<8,500 lbs GVWR)								
Domestic	16.8	19.6	20.3	20.3	20.5	^R 20.2	20.5	20.4
Imported	24.3	26.5	23.0	21.5	22.2	22.1	22.9	22.5
CAFE standards (mpg)^a (model year)								
Passenger car	20.0	27.5	27.5	27.5	27.5	27.5	27.5	27.5
Light truck	16.0/14.0 ^b	19.5	20.0	20.6	20.7	20.7	20.7	20.7

^a Assumes 55% city and 45% highway-miles. The source calculated average miles per gallon for light-duty vehicles by taking the reciprocal of the sales-weighted average of gallons per mile. This is called the harmonic average.

^b 2 Wheel Drive/4 Wheel Drive. No combined figure available for this year.

NOTE: The fuel efficiency figures for light duty vehicles represent the sales-weighted harmonic average of the combined passenger car and light truck fuel economies.

SOURCES:

Average U.S. passenger car fuel efficiency: 1980-90: U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics Summary to 1995*, FHWA-PL-97-009 (Washington, DC: July 1997), table VM-201A.

1995-98: Ibid., *Highway Statistics* (Washington, DC: Annual issues), table VM-1.

New vehicle fuel efficiency (based on model year production):

1980-90: U.S. Environmental Protection Agency, final fuel economy calculations for the U.S. Department of Transportation, National Highway Traffic Safety Administration, as cited in

KEY: CAFE = Corporate Average Fuel Economy;
GVWR = gross vehicle weight rating;
mpg = miles per gallon; R = revised;

Internet site

www.nhtsa.dot.gov/cars/problems/fuelecon/index.html.

1995-99: Manufacturer's preliminary estimates for the U.S. Department of Transportation, as cited in National Highway Traffic Safety Administration, *Automotive Fuel Economy Program, Twenty-Fourth Annual Report to Congress, Calendar Year 1999*, Internet site www.nhtsa.dot.gov/cars/problems/fuelecon/index.html.

CAFE standards: 1980-99: U.S. Department of Transportation, National Highway Traffic Safety Administration, *Automotive Fuel Economy Program, Twenty-Fourth Annual Report to Congress, Calendar Year 1999*, Internet site www.nhtsa.dot.gov/cars/problems/fuelecon/index.html.

Table 4-24 Energy Intensity of Transit Motor Buses

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998
Vehicle-miles (millions)	1,576	1,528	1,409	1,526	1,677	1,863	2,130	2,184	2,165	2,307	2,291
Passenger-miles (millions)	N	N	N	N	21,800	21,200	21,000	18,800	19,100	20,400	20,603
Fuel consumed (million gallons diesel)	208	248	271	365	431	518	563	564	^R 577	^R 597	^P 554
Energy intensity (Btu/passenger-mile)	N	N	N	N	2,742	3,389	3,718	4,161	4,029	^R 4,059	3,730

NOTES: Heat equivalent factor used for Btu conversion is 138,700 Btu/gallon. In January 2000, the American Public Transit Association changed its name to the American Public Transportation Association (APTA). The *Transit Fact Book* is now referred to as the *Public Transportation Fact Book*.

SOURCE: American Public Transportation Association, *Public Transportation Fact Book* (Washington, DC: March 2000), tables 65 and 79, and similar tables in earlier editions of the *Transit Fact Book*.

KEY: Btu = British thermal unit; N = data do not exist; P = preliminary; R = revised

Table 4-25 Energy Intensity of Class I Railroad^a Freight Service

	1960	1965	1970	1975	1980	1985	1990	1995	1996	1997	1998	1999
Revenue freight ton-miles (millions)	572,309	697,878	764,809	754,252	918,958	876,984	1,033,969	1,305,688	1,355,975	1,348,926	1,376,802	1,433,461
Car-miles (millions)	28,170	29,336	29,890	27,656	29,277	24,920	26,159	30,383	31,715	31,660	32,657	33,851
Tons per car load	44	49	55	61	67	68	67	65	67	63	64	63
Fuel consumed (million gallons)	3,463	3,592	3,545	3,657	3,904	3,110	3,115	3,480	3,579	3,575	3,583	3,715
Energy intensity (Btu/revenue freight ton-mile)	839	714	643	672	589	492	418	370	366	368	361	359
Energy intensity (Btu/car-mile)	17,051	16,983	16,450	18,341	18,495	17,310	16,516	15,886	15,652	15,662	15,218	15,222

^a Class I railroads are those that have operating revenues of \$255 million or more.

NOTE: The heat equivalent factor used for Btu conversion is 138,700 Btu/gallon.

SOURCE: Association of American Railroads, *Railroad Facts* (Washington, DC: November 2000).

KEY: Btu = British thermal unit

Table 4-26 Energy Intensity of Amtrak Services

	1975	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Revenue passenger-miles (millions)	3,931	4,503	4,785	6,057	6,273	6,091	6,199	5,921	5,545	5,050	5,166	5,304	5,330
Locomotive fuel consumed													
Total fuel consumed (billion Btu) ^a	9,367	9,673	9,995	12,512	12,406	12,328	12,511	11,457	10,191	10,875	11,365	11,341	11,229
Electric (millions of kWh) ^a	180	254	295	330	303	300	301	309	304	293	282	275	283
Diesel (million gallons)	63	64	65	82	82	82	83	75	66	71	75	75	74
Energy intensity													
(Btu/revenue passenger-mile) ^a	2,383	2,148	2,089	2,066	1,978	2,024	2,018	1,935	1,838	2,153	2,200	2,138	2,107

^a Does not include electric power generation and distribution losses, which, if included, would triple the electric conversion factor given below, and would increase the numbers in this row by about 20%.

NOTE: The heat equivalent factors used in Btu conversion are: diesel = 138,700 Btus/gallon; electric = 3,412 Btu/kWh.

SOURCES:

Revenue passenger-miles: Amtrak, *Amtrak Annual Report*, Statistical Appendix (Washington, DC: Annual issues).

Locomotive fuel consumed: 1975-99: Ibid., State and Local Affairs Department, personal communications.

KEY: Btu = British thermal unit; kWh = kilowatt hour

Table 4-27 Annual Wasted Fuel Due to Congestion

Urban area	Gallons Wasted (millions)							% change			
	R1982	R1986	R1990	R1992	R1995	R1996	1997	Short-term 1992-1997		Long-term 1982-1997	
								%	Rank	%	Rank
Albany-Schenectady-Troy, NY	0	2	4	4	4	5	5	25	50	NM	59
Albuquerque, NM	2	4	9	11	19	22	25	127	6	1150	3
Atlanta, GA	31	69	71	84	162	185	214	155	3	590	22
Austin, TX	5	11	14	20	27	30	40	100	11	700	14
Bakersfield, CA	0	0	2	2	2	3	3	50	32	NM	59
Baltimore, MD	26	44	84	82	114	117	123	50	32	373	36
Beaumont, TX	0	0	0	1	2	2	2	100	11	NM	59
Boston, MA	63	109	163	175	220	229	236	35	43	275	42
Boulder, CO	0	0	0	0	0	0	0	NM	65	NM	59
Brownsville, TX	0	0	0	0	0	0	0	NM	65	NM	59
Buffalo-Niagara Falls, NY	3	3	7	7	8	8	9	29	47	200	48
Charlotte, NC	4	6	12	14	18	20	27	93	16	575	23
Chicago, IL-Northwestern, IN	108	205	271	297	342	371	398	34	44	269	44
Cincinnati, OH-KY	8	11	26	32	41	43	49	53	31	513	27
Cleveland, OH	4	7	19	23	37	44	48	109	9	1100	4
Colorado Springs, CO	0	2	2	4	7	7	7	75	22	NM	59
Columbus, OH	4	6	18	20	33	32	37	85	18	825	12
Corpus Christi, TX	2	2	2	2	2	3	3	50	32	50	58
Dallas, TX	33	81	87	97	133	136	162	67	26	391	34
Denver, CO	17	27	43	52	80	88	96	85	18	465	29
Detroit, MI	98	131	211	241	245	266	288	20	53	194	49
El Paso, TX-NM	2	2	4	7	8	7	9	29	47	350	38
Eugene-Springfield, OR	0	0	0	0	1	2	2	NM	65	NM	59
Fort Lauderdale-Hollywood- Pompano Beach, FL	7	14	18	35	44	49	55	57	30	686	17

KEY: NM = not meaningful; R = revised

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Table 4-27

Cont'd

Annual Wasted Fuel Due to Congestion

Urban area	Gallons Wasted (millions)							% change			
	R ¹⁹⁸²	R ¹⁹⁸⁶	R ¹⁹⁹⁰	R ¹⁹⁹²	R ¹⁹⁹⁵	R ¹⁹⁹⁶	1997	Short-term 1992-1997		Long-term 1982-1997	
								%	Rank	%	Rank
Fort Worth, TX	11	24	34	34	47	52	59	74	23	436	31
Fresno, CA	2	4	9	7	8	8	10	43	38	400	33
Hartford-Middletown, CT	3	10	17	18	15	16	19	6	60	533	25
Honolulu, HI	10	15	21	23	25	24	25	9	58	150	52
Houston, TX	103	133	120	122	140	167	206	69	25	100	55
Indianapolis, IN	3	7	14	19	53	55	61	221	1	1933	1
Jacksonville, FL	8	11	18	20	29	33	33	65	27	313	40
Kansas City, MO-KS	4	8	15	17	32	38	45	165	2	1025	7
Laredo, TX	0	0	0	0	0	0	0	NM	65	NM	59
Las Vegas, NV	3	7	22	22	41	45	44	100	11	1367	2
Los Angeles, CA	490	764	1,044	1,042	1,066	1,092	1,108	6	60	126	54
Louisville, KY-IN	4	7	12	22	32	39	42	91	17	950	9
Memphis, TN-AR-MS	4	4	11	15	27	30	32	113	7	700	14
Miami-Hialeah, FL	44	61	102	119	125	118	136	14	56	209	47
Milwaukee, WI	7	12	22	31	41	39	38	23	51	443	30
Minneapolis-St. Paul, MN	8	20	37	47	76	80	96	104	10	1100	4
Nashville, TN	5	9	15	15	27	30	35	133	5	600	21
New Orleans, LA	16	25	30	31	36	33	32	3	62	100	55
New York, NY-Northeastern, NJ	314	405	616	567	680	724	802	41	40	155	51
Norfolk, VA	9	18	25	25	31	38	41	64	28	356	37
Oklahoma City, OK	2	3	7	9	15	20	22	144	4	1000	8
Omaha, NE-IA	3	5	10	14	18	21	19	36	42	533	25
Orlando, FL	7	13	15	29	35	42	50	72	24	614	20
Philadelphia, PA-NJ	70	92	113	120	139	159	166	38	41	137	53
Phoenix, AZ	25	48	62	65	73	90	93	43	38	272	43

KEY: NM = not meaningful; R = revised

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Table 4-27
Cont'd**Annual Wasted Fuel Due to Congestion**

Urban area	Gallons Wasted (millions)							% change			
	R ¹⁹⁸²	R ¹⁹⁸⁶	R ¹⁹⁹⁰	R ¹⁹⁹²	R ¹⁹⁹⁵	R ¹⁹⁹⁶	1997	Short-term 1992-1997		Long-term 1982-1997	
								%	Rank	%	Rank
Pittsburgh, PA	12	19	28	27	33	32	33	22	52	175	50
Portland-Vancouver, OR-WA	11	25	38	52	75	85	84	62	29	664	19
Providence-Pawtucket, RI-MA	4	9	20	16	21	24	23	44	37	475	28
Rochester, NY	1	2	4	6	8	9	9	50	32	800	13
Sacramento, CA	8	16	42	43	50	57	54	26	49	575	23
Salem, OR	0	0	2	2	2	2	3	50	32	NM	59
Salt Lake City, UT	2	2	7	13	22	23	23	77	21	1050	6
San Antonio, TX	8	21	17	19	30	34	38	100	11	375	35
San Bernardino-Riverside, CA	9	25	50	62	70	74	72	16	55	700	14
San Diego, CA	15	47	100	108	111	114	117	8	59	680	18
San Francisco-Oakland, CA	149	241	288	276	286	291	280	1	63	88	57
San Jose, CA	20	42	80	85	87	89	86	1	63	330	39
Seattle-Everett, WA	40	74	122	150	143	148	165	10	57	313	40
Spokane, WA	0	2	2	2	3	3	4	100	11	NM	59
St. Louis, MO-IL	23	36	55	66	116	117	122	85	18	430	32
Tacoma, WA	2	7	17	18	18	18	21	17	54	950	9
Tampa, FL	12	16	23	29	38	37	38	31	46	217	46
Tucson, AZ	2	2	8	9	13	15	19	111	8	850	11
Washington, DC-MD-VA	101	164	225	248	300	326	327	32	45	224	45

NOTES: "Wasted" fuel is the difference between the fuel consumed under estimated existing conditions and the fuel consumed if all traffic was moving at free-flow conditions. Calculations are made for peak period speeds and for free-flow speeds on both the free-way and principal arterial systems. For a more detailed description of the formulas used, see the source document. The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the study.

SOURCES: 1982-1996: Texas Transportation Institute, unpublished data.

1997: Ibid., *The 1999 Annual Urban Mobility Report* (College Station, TX: 1999), table 6.

KEY: NM = not meaningful; R = revised

Table 4-28

Wasted Fuel per Eligible Driver

Urban area	Gallons Wasted							% change			
	R ¹⁹⁸²	R ¹⁹⁸⁶	R ¹⁹⁹⁰	R ¹⁹⁹²	R ¹⁹⁹⁵	R ¹⁹⁹⁶	1997	Short-term 1992-1997		Long-term 1982-1997	
								%	Rank	%	Rank
Albany-Schenectady-Troy, NY	0	5	10	10	10	13	13	30	40	NM	59
Albuquerque, NM	6	11	23	28	45	51	57	104	6	850	3
Atlanta, GA	25	53	43	47	84	96	106	126	3	324	30
Austin, TX	17	30	33	45	57	63	82	82	14	382	27
Bakersfield, CA	0	0	10	9	8	12	12	33	38	NM	59
Baltimore, MD	20	31	54	51	68	69	72	41	32	260	35
Beaumont, TX	0	0	0	11	20	18	18	64	18	NM	59
Boston, MA	27	48	67	73	91	95	98	34	37	263	34
Boulder, CO	0	0	0	0	0	0	0	NM	62	NM	59
Brownsville, TX	0	0	0	0	0	0	0	NM	62	NM	59
Buffalo-Niagara Falls, NY	4	4	9	8	10	10	11	38	35	175	44
Charlotte, NC	15	19	34	36	42	45	61	69	17	307	31
Chicago, IL-Northwestern, IN	20	38	47	51	58	62	65	27	46	225	39
Cincinnati, OH-KY	9	13	30	34	42	44	50	47	26	456	18
Cleveland, OH	3	5	14	16	26	30	33	106	5	1000	2
Colorado Springs, CO	0	9	9	16	24	23	23	44	28	NM	59
Columbus, OH	6	9	27	27	42	41	47	74	15	683	9
Corpus Christi, TX	11	10	10	10	9	13	13	30	40	18	58
Dallas, TX	24	55	56	62	78	78	92	48	25	283	33
Denver, CO	16	23	34	43	61	65	70	63	20	338	29
Detroit, MI	35	46	72	79	80	86	92	16	51	163	47
El Paso, TX-NM	6	6	10	18	19	16	20	11	53	233	38
Eugene-Springfield, OR	0	0	0	0	6	13	12	NM	62	NM	59
Fort Lauderdale-Hollywood- Pompano Beach, FL	8	14	17	35	40	42	47	34	36	488	14
Fort Worth, TX	13	28	37	38	49	54	60	58	22	362	28

KEY: NM = not meaningful; R = revised

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Table 4-28
Cont'd

Wasted Fuel per Eligible Driver

Urban area	Gallons Wasted							% change			
	R ¹⁹⁸²	R ¹⁹⁸⁶	R ¹⁹⁹⁰	R ¹⁹⁹²	R ¹⁹⁹⁵	R ¹⁹⁹⁶	1997	Short-term 1992-1997		Long-term 1982-1997	
								%	Rank	%	Rank
Fresno, CA	8	14	29	20	22	22	26	30	40	225	39
Hartford-Middletown, CT	7	23	37	37	31	32	38	3	60	443	21
Honolulu, HI	22	31	38	43	46	44	45	5	57	105	51
Houston, TX	57	63	55	56	63	73	90	61	21	58	57
Indianapolis, IN	5	10	19	26	68	70	79	204	1	1480	1
Jacksonville, FL	17	22	33	35	48	54	53	51	24	212	42
Kansas City, MO-KS	5	9	17	18	31	37	44	144	2	780	8
Laredo, TX	0	0	0	0	0	0	0	NM	62	NM	59
Las Vegas, NV	9	18	42	35	53	55	50	43	29	456	18
Los Angeles, CA	64	92	118	118	120	122	122	3	59	91	53
Louisville, KY-IN	7	11	19	37	49	59	63	70	16	800	5
Memphis, TN-AR-MS	7	7	17	23	39	42	44	91	9	529	13
Miami-Hialeah, FL	31	43	69	79	80	73	83	5	56	168	46
Milwaukee, WI	8	13	24	33	43	41	39	18	50	388	26
Minneapolis-St. Paul, MN	6	14	23	28	43	45	53	89	12	783	7
Nashville, TN	13	22	33	33	55	61	71	115	4	446	20
New Orleans, LA	20	31	37	37	42	38	37	0	62	85	54
New York, NY-Northeastern, NJ	24	33	46	41	49	52	58	41	31	142	49
Norfolk, VA	15	27	34	34	40	49	52	53	23	247	37
Oklahoma City, OK	4	5	13	15	21	27	29	93	8	625	11
Omaha, NE-IA	8	13	26	35	43	50	45	29	44	463	17
Orlando, FL	15	24	22	42	44	52	60	43	29	300	32
Philadelphia, PA-NJ	22	29	32	31	34	39	40	29	43	82	55
Phoenix, AZ	23	37	43	42	42	50	51	21	49	122	50
Pittsburgh, PA	8	13	18	18	22	21	22	22	48	175	44

KEY: NM = not meaningful; R = revised

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Table 4-28

Cont'd

Wasted Fuel per Eligible Driver

Urban area	Gallons Wasted							% change			
	R ¹⁹⁸²	R ¹⁹⁸⁶	R ¹⁹⁹⁰	R ¹⁹⁹²	R ¹⁹⁹⁵	R ¹⁹⁹⁶	1997	Short-term 1992-1997		Long-term 1982-1997	
								%	Rank	%	Rank
Portland-Vancouver, OR-WA	14	30	44	60	79	85	80	33	38	471	15
Providence-Pawtucket, RI-MA	6	14	30	23	30	34	32	39	34	433	23
Rochester, NY	2	5	9	13	17	19	19	46	27	850	3
Sacramento, CA	12	22	50	48	55	62	59	23	47	392	25
Salem, OR	0	0	17	15	15	14	21	40	33	NM	59
Salt Lake City, UT	4	3	11	22	35	37	36	64	18	800	5
San Antonio, TX	12	28	20	22	33	37	42	91	10	250	36
San Bernardino-Riverside, CA	13	34	59	67	73	77	74	10	54	469	16
San Diego, CA	11	30	55	57	57	59	59	4	58	436	22
San Francisco-Oakland, CA	56	86	96	91	93	94	91	0	62	63	56
San Jose, CA	23	42	75	73	73	72	69	-5	68	200	43
Seattle-Everett, WA	33	56	83	104	94	96	106	2	61	221	41
Spokane, WA	0	9	9	8	12	12	16	100	7	NM	59
St. Louis, MO-IL	16	24	36	43	75	75	79	84	13	394	24
Tacoma, WA	6	19	45	44	41	40	47	7	55	683	9
Tampa, FL	29	33	41	51	58	57	58	14	52	100	52
Tucson, AZ	6	6	20	20	27	30	38	90	11	533	12
Washington, DC-MD-VA	46	69	88	91	106	115	116	27	45	152	48

NOTES: "Wasted" fuel is the difference between the fuel consumed under estimated existing conditions and the fuel consumed if all traffic was moving at free-flow conditions. Calculations are made for peak period speeds and for free-flow speeds on both the free-way and principal arterial system. For a more detailed description of the formulas used, see the source document. An eligible driver is someone 16 years and older who is eligible for a driver's license. The cities shown represent the 50 largest metropolitan areas, as well as others chosen by the states sponsoring the study.

SOURCES: 1982-1996: Texas Transportation Institute, unpublished data.

1997: Ibid., *The 1999 Annual Urban Mobility Report* (College Station, TX: 1999), table 6.

KEY: NM = not meaningful; R = revised